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Sir David Dickson
from his friend
Astley Cooper

OBSERVATIONS

ON

THE THYROID GLAND,

BY MR. T. W. KING.

WITH NOTES ON THE SAME SUBJECT,

BY SIR ASTLEY COOPER, BART.

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PART I.—LOBES—CELLS.

The present contribution is chiefly intended to supply a succinct view of the peculiar structure and adaptions of the thyroid gland; so that the more generally established anatomical relations of the organ need only be introduced as they may appear essential to these points*.

For a general history of the thyroid gland, it will be sufficient to refer the student to the volumes of descriptive anatomy. The account given by Cloquet will be found tolerably concise; but that of Meckel is the more complete.

Many recent anatomists seem to have observed that the thyroid gland contains a fluid; a few have adverted to its lobular structure; and others to an opinion that its more minute organization is granular.

The circumstances to be expatiated on in these observations relate principally to the form and arrangement of the lobules of the gland; to the nature of its cells and secretion; to its varying states of mechanical compression and sanguineous injection; and also to the transmission of its peculiar fluid, by the lymphatics, to the venous system. For the knowledge of these particulars, the author has depended solely on his own investigations and experiments, excepting where it will appear otherwise stated. It may also be advanced, in corroboration of the whole, that his preparations, preserved in the Museum, will be found to illustrate almost every fact hereafter to be adduced.

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* It is very well also to state here, that there are many circumstances in the anatomical history of the class Mammalia which materially affect the subject; but without entering upon a detail of these, the Author has availed himself of his researches in comparative anatomy just so far as they seemed directly illustrative of particular facts within the scope of the present inquiry. These references will be made chiefly in the form of notes.

In order to display the structure of the thyroid gland most satisfactorily, it is necessary to make choice of a favourable specimen—one of an early adult period, fully developed, but without the condensation of membranes with which it is sometimes affected. The examination will be facilitated, if the part be rendered moderately firm by immersion in alcohol.

Considerable time and pains are required to remove completely the firm reticular membrane which surrounds the gland together with its larger vessels, and accompanies the smaller ramifications into the interior. This is the only tunic of the gland; and its prolongations form imperfect septa, extending into the interior of the organ. If there be no unusual difficulty in dissecting this away, it will finally be manifest, that the surface of the gland is covered with, or formed by, a set of laminated lobules (as it were, chips of the gland), rather irregular in size and form, but about equal in extent to the little-finger nail, somewhat lengthened perpendicularly, and attached, for the most part inferiorly, by one end or edge. These lobules are very little susceptible of subdivision, and no where admit of complete separation without injury to the glandular texture. (See Plate I. *Fig.* 1 & 2.)

When, under favourable circumstances, the careful separation of the lobules, with the removal of membrane and vessels, is carried to the farthest extent, the entire mass of the gland is found to consist of lobules, which internally, however, appear of a larger size and more solid figure; but it will still be evident, that the general arrangement is that of laminated lobules superposed upon each other, more or less in a concentric order, upon the air tube and œsophagus*. The result of this superposition of flattened lobules seems to be, that all the parts of the gland are the more uniformly compressed during the repeated contractions of the muscles which surround it; and, besides this, the interstices may admit a more easy passage to the vessels, and a more ready alteration of form in the several parts with which the varying states of compression, degrees of injection, or quantities of secretion may be attended.

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* The distinct lobular structure of the thyroid gland seems to belong to it principally in the condition of its greatest development, as in man. Traces of lobules are found in some animals, as the horse; but particularly in the hog. In the dog and cat the arrangement seems to be that of a number of small grains, more or less cubical (or polyphedral), closely packed into a flattened ovoid mass.

The ultimate structure of the lobules is essentially cellular; that is to say, besides the necessary vascular elements of organization, there is evidently nothing but a close aggregation of simple spherical or many-sided cells, of minute, but pretty uniform size, and without perceptible apertures of communication *. (See *Fig.* 2 & 3.)

The proper contents of these cells are a fluid, which exists in widely-different quantities; and the cells are more or less visible, in proportion to the quantity of their contents. It is rare, however, to find them quite devoid of the secretion. An incision into the gland may scarcely yield a drop, and the cells may be actually invisible; yet, on immersing the part in water, the latter appears to combine with the secretion, and the cells are seen to become expanded in consequence. The cells must, indeed, become microscopic objects when emptied of their peculiar fluid; but even when no vestige of them appears to the naked eye, a portion of the gland, subjected to the action of alcohol or heat, will yield a vast number of minute grains of the consolidated secretion; which, as well as the containing cells, present very beautiful appearances under the microscope.

The most careful examination leaves little room for the supposition that the fluid belongs to any other part than the cells. It is of course impossible to define the largest size to which the cells may attain in the healthy or physiological condition; but it cannot be doubted, that a distension which materially exceeds the dimensions of a small pin's head must be morbid †.

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* The formation of the spherical cells seems to prevail in all quadrupeds in whom the gland is found. The peculiar coagulable fluid, likewise, is as constantly produced. The glands, hardened in alcohol, and placed, in very thin slices, beneath the microscope, afford very satisfactory demonstration of these circumstances; and no exception has hitherto been found. In the rabbit a few weeks old, the appearances are most complete and distinct.

† I have seen a great many cases of this kind: and besides these, from personal examinations of upwards of forty specimens, it is pretty obvious that nearly all the marked diseases of the thyroid gland consist in derangements of the natural cells; their partial or general atrophy; their dilatation, universally or in small numbers; the various alterations of the contents f the dilated cells, whether serous, bloody, or discoloured, albuminous, cartaliginous,

To convey a tolerably accurate idea of the mean capacity of the thyroid cells, they may be compared, in extent, to ordinary grains of sand. It is certain, however, that their natural dilatation may considerably exceed this limit.

As we have already seen, the coagulation of the thyroideal fluid is a peculiarly advantageous means of bringing into view the anatomical arrangements of the parts producing it; and it is probable, that beyond this structure little remains to be explored of peculiar organization. The results of experiment, the researches of chemistry, and the observations of pathology, will severally afford a useful share of information. The actual uses of the gland; the varying ingredients, or proportions of ingredients, in the venous and absorbent fluids; together with the varying degrees of functional activity in the arteries, veins, and absorbents, and especially in the two last, when compared; must all depend for their elucidation upon other than anatomical knowledge.

Those anatomists who have attributed a granular structure to the thyroid gland have doubtless been led to such a conclusion from the appearance of the organ in particular states. When the cells contain but little fluid, and the general texture is rather more than usually injected with blood, a granular character is manifested, both on the dissected surface and within, whether the body be torn or incised. Under these circumstances, it is easy to perceive that each cell is included in a vascular parenchymatous tissue, which, compared with the

tilaginous, bony, or puriform; the thickening, induration, or ossification of one or more of the cells subsequent to a morbid dilatation. Other changes are less common. A general atrophy may be combined with more or less increase and induration of the cellular tissue of the gland, to which I have already adverted. I have also found the site of the gland occupied entirely by condensed cellular tissue, with the exception of two pea-sized portions of true gland situated on one side within this tissue. In this case, the peculiarities of the individual were fully sufficient to indicate the importance of the defective part.

Malignant diseases sometimes encroach upon, and very rarely develope themselves in this body. The morbid anatomist should by no means neglect the inspection of the thyroid gland. Its connexion with diathesis, and many diseases, forms already a promising subject of investigation. The dimensions, colour, and consistence of the organ, the quantity and nature of its secretion, with the size of its arteries, merit particular attention. I have already a variety of facts relative to these points; and trust, hereafter, to bring them forward in a connected and available form.

inclosed cavity, is by no means inconsiderable in substance: it seems to diminish, however, as the injection diminishes, and when the cells become distended. In both these cases, the colour of the gland declines, and the appearance of granules gives place to that of well-developed cells. (*Fig.* 2.)

The investing membranes of the cells are at all times rendered very thin by the action of alcohol; whilst the contained secretion is completely consolidated, and almost without diminution.

PART II.—THE FLUID—ARTERIES—VEINS—ABSORBENTS—NERVES.

The fluid of the thyroid gland is certainly peculiar. In colour, it approaches the serum of the blood. Collected on the point of a knife (after incising the gland), it appears like weak gum, and is almost devoid of the ropiness of white of egg. Its bulk diminishes little when the substance is dried: at the same time, it becomes hard, somewhat darker, and less translucent. The fluid put into common rectified spirit seems only to lose a little water: it becomes solid, but not opake, and decreases but slightly. The same effects result in the cells when the gland is boiled for a quarter of an hour, and no apparent solution occurs. These are highly characteristic phænomena; although the coagulation, without opacity, may possibly be found to depend on very slight peculiarities of composition. The fluid when mixed with water seems to assume a turbidity with most of the ordinary tests for albumen; and, without dilution, may sometimes be rendered opake by a very weak nitric acid, as if it were that an alkaline influence is thus neutralized. The proper distinguishing characters are—its originally feebly mucilaginous form, and its subsequent bulkiness or massiveness when dried into a solid; and, again, its complete coagulation, without opacity, in alcohol, or when boiled, although the firmness thus produced is greater than that which results when the pure white of egg is operated on.

With respect to the chemical composition of the thyroideal secretion, it is evident that the difficulty of obtaining it in abundance, purity, and in a healthy condition, renders it impossible, even in the course of months, to afford a satisfactory account. We have, likewise, still to regret the imperfection of our means of examining ultimate organic elements.

I am indebted to Mr. R. H. Brett for the following analysis of the saline matters existing in the thyroid gland; and is fully disposed to confide in its accuracy.

Ten grains of the dried gland were ignited: they burnt with a small flame, and peculiar odour of animal matter: the ash which resulted was of a pale fawn colour, weighing .5 of a grain: it was faintly alkaline in its re-action. When treated with boiling distilled water, the greater part was dissolved: the insoluble portion was dissolved in diluted muriatic acid, without any appreciable effervescence.

ACTION OF RE-AGENTS ON THE AQUEOUS SOLUTION, WHICH WAS FAINTLY ALKALINE WHEN CONCENTRATED.

Re-agents.	
1. Solution of nitrate silver and nitric acid	A precipitate.
2. Solution of chloride of barium and nitric acid	A mere troubling, and that only after some time.
3. Ammonia, after boiling and filtering the fluid treated by the last re-agents	A precipitate.
4. Acetic acid, after evaporating the aqueous solution nearly to dryness .	No appreciable effervescence.
5. Chloride of platinum, after concentrating the aqueous solution by evaporation	No precipitate at first: a very scanty one only, after some hours.

ACTION OF RE-AGENTS ON THAT PORTION OF THE ASH INSOLUBLE IN WATER, BUT SOLUBLE IN MURIATIC ACID.

Re-agents.	
1. Ammonia	A precipitate.
2. Oxalate of ammonia, after the fluid treated by the last re-agent had been rendered slightly acid by acetic acid	A precipitate.
3. Ammonia, after the fluid treated by the last re-agents had been boiled and filtered	No precipitate.
4. Ferro-cyanate of potass, after concentrating the muriatic acid solution	A blue colour.
5. Sulpho-cyanate of potass, after concentrating the acid solution . . .	A red colour.

The effect of re-agents on the aqueous solution points out the presence, 1. of an alkaline chloride; 2. of an alkaline sulphate (mere traces however); 3. of an alkaline phosphate; 4. the absence of any notable proportion of an alkaline carbonate; 5. mere traces of potass.

On the acid solution, 1. an earthy phosphate; 2. phosphate of lime; 3. the absence of a magnesian phosphate; 4, & 5. the presence of oxide of iron.

One hundred grains of the dried gland may therefore be considered as yielding five grains of fixed saline matter and oxide of iron; as follows:

Alkaline chloride (most probably common salt);
Alkaline sulphate (mere traces);
Alkaline phosphate;
Phosphate of lime;
Oxide of iron;
Free alkali (probably potass), traces only.

The ash obtained from the thyroid gland differs from that obtained from blood, in its containing mere traces only of an alkaline sulphate; in the absence of phosphate of magnesia; and in its not containing, in any appreciable quantity at least, the alkaline or earthy carbonate. This ash differs from that obtained from the salivary secretion, in containing mere traces only of potass, whereas the latter contains a considerable proportion; also, in not containing any notable quantity, if any, of an alkaline carbonate; whereas the ash from saliva contains a considerable proportion: lastly, in the absence of magnesia, which exists in saliva, and in the presence of iron, which is absent in saliva: the latter ingredient, however, is probably derived from the blood contained in the gland, rather than from the secretion itself. The ash in question differs from that obtained from the pancreatic secretion, in the latter containing a considerable quantity of alkaline carbonate; but it approaches it in the circumstance of containing only traces of an alkaline sulphate.

When the arteries of the thyroid gland have been successfully injected with size and vermilion, there will be found but little reason to regard its capillaries as few or small: the colouring matter penetrates freely to the walls of the cells. In truth, the vascularity of the organ is much more considerable than it is usually seen, or supposed to be; for, like a variety of organs that are liable to periodical or temporary excitements, it is generally found somewhat pale, from the collapsed or contracted state of its capillaries.

The arterial supply of this gland has, in one respect, been very long a subject of pointed observation. That a body scarcely equal, in its maturest developement, to the half of a kidney should possess four or five large arteries, and still continue of so pale a colour, might well excite the remarks of the physiologist. We find, however, some analogy of circumstances in the states of the salivary glands, in which the arteries are considerable, whilst the injection and secretion are only occasional, though copious, and the intermediate conditions comparatively bloodless and inactive.

In the human subject, within one or two days after death, the gland is commonly found of a pale dusky red colour; but it occasionally presents a more vascular hue, and sometimes an appearance of very considerable injection. During the years of infancy, the vascularity of this part seems always great; yet it is not at all times the same. In animals examined whilst dying, under different circumstances, the injection is variable, but at certain times very great*.

The thyroideal veins are both very numerous and very capacious; and this applies not only to the principal trunks, but also to an abundant set of branches spreading and uniting over the surface of the gland, and diffused throughout the lobular interstices. It is quite evident that the larger branches possess valves, and it is probable that the small branches do likewise; yet the artificial injection of these vessels from trunk to branch is readily effected. Notwithstanding, it seems likely that the natural pressure exerted upon the veins must not only obviate the dilatation which might otherwise render the valves imperfect, but must likewise, by its continued repetitions, with the assistance of the valves, accelerate the venous circulation.

The lymphatic vessels of the thyroid gland appear to have been long well understood by anatomists. They are found, comparatively, of large size, and in great numbers. They pass out from, and cover all parts of the surface of the gland; form some junctions; and proceed, for the most part, into neighbouring absorbent glands. They sometimes appear to possess a rather less delicate structure than other lymphatics. Their valves are numerous: three or four pairs may occasionally be counted in a tube that is scarcely more than a quarter of an inch in length.

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* When living animals are examined, which they may easily be by first rendering them insensible, it is of essential importance to be aware that the general injection and turgescence of the body varies greatly; so that the vascular state of any one organ can only be safely considered by comparison with that of others in the same creature.

There are very considerable vessels to be seen descending over the isthmus, and from its neighbourhood; and others, also, both descending and ascending, on the extreme lateral surfaces of the gland.

The most important novel fact concerning the thyroid gland is doubtless this, that its absorbent vessels carry its peculiar secretion to the great veins of the body *. And the most simple and satisfactory method of demonstrating this fact is, to expel the contents of a healthy gland, by repeated and gentle compressions, into the lymphatics of the surface, and then to coagulate the fluid in these vessels. In this process, the delicate little lymphatics are first seen leaving the substance of the gland, and uniting, upon its surface, into trunks: and these, by the coagulation of their contents †, are rendered solid cords, with a very slight diminution of their capacity. (*Fig.* 4 & 5.)

It is very rare, indeed, to find sufficient fluid in the lymphatic vessels before manipulating the gland; and it far more commonly happens that none of this fluid can be procured in the vessels. The contents of neighbouring absorbent vessels evidently possess a much smaller proportion of fibrinous and albuminous matter; and, moreover, it has seemed fully clear that the thyroid fluid becomes diluted in its progress towards the great veins, both by the influence of absorbent glands, and by the accession of fluids from adjoining vessels with which the thyroid lymphatics unite ‡. The absorbent glands which are distributed around the thyroid are very numerous; but a few in particular, of very small size, seem to belong to this body: these are flattened and circular. One or two of them are impressed upon the lateral margins of the great lobes, posteriorly: one is often placed above the isthmus, and another in the mesian notch of the scutiform cartilage: some range beneath the under edge of the gland, and upon the trachea; and the smallest of them are but a very little larger than a pin's head.

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* This has been indirectly surmised by Morgagni and others.

† Upon collecting a little drop from one of these distended lymphatic duct, and applying the test of alcohol, the solidity of the matter has remained as when within the gland, but its translucence has been less marked. I cannot say, however, that the small absorbent glands have had no share in this effect.

‡ The first case in which these vessels were discovered full of the coagulable secretion, occurred in the body of a man who died suddenly and apoplectic. I have scarcely ever succeeded in this process with more than one or

The peculiar circumstances which, on daily recurrent occasions, submit the thyroid gland to the kneading kind of pressure already hinted at, are equally remarkable with regard to their influence upon the proper absorbent glands; and especially upon the veins and lymphatics, when the action of their valves is duly considered.

It is observable of the thyroideal veins and absorbents, that they both transfer their contents, more or less directly, to that point at which the general mass of the absorbent fluids is poured into the sanguineous system.

The thyroideal nerves are very inconsiderable: the coats of the arteries may convey others which can hardly be of greater importance: and if, indeed, the gland be supplied with nervous influence throughout its substance, we have no grounds to attribute any peculiar operation to it.

PART III.—RELATIVE POSITION—SOURCES OF COMPRESSIONS.

The situation or relative position of the thyroid gland will be found well worthy of notice, in connexion with the varying conditions which are incidental to it. Although the gland is differently placed in several orders of mammalia, it is remarkable, that in a great variety of them (indeed in all that have been examined with this view) it is so situated, as to be subject to a species of kneading during the efforts of mastication and deglutition. It is affected by the motions of surrounding parts, very much in the same manner as the salivary organs.

This statement is founded on the examination of individuals

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or two vessels in a single gland: for, unless the small tubes can be pretty completely distended, the effect is unsatisfactory, or at least less conclusive.

of the quadrumana feræ, rodentia, marsupialia, ruminantia, pachydermata, and cetacea; and every case has afforded a marked confirmation of its truth*.

Man offers a very complete example of this kind of muscular manipulation. It is only necessary to mention several of the sources of pressure: The motions of the larynx, both vertically and towards the spine; the distension of the œsophagus in the descent of food; and the action of the muscles investing the gland—the sterno-hyoideus, omo-hyoideus, and sterno-thyroideus. It may require a little more attention, to perceive an additional source of successive compressions, during the descent of the larynx which is particularly conspicuous in the human subject. Here, the thyroid gland, including parts of the air-tube, may be represented by the half of a cone divided in its axis; an obtuse point being directed inferiorly, a convexity forwards, and a flattened surface towards the spine and œsophagus. Now it may be seen, that upon the descent of the larynx, in completing the act of deglutition, the thyroid gland is, as it were, wedged into a cavity, of corresponding size and figure, which is formed for it between the mastoid muscles, the vertebræ, and the great cervical vessels. It is easy to shew, in experiment, that this action must be somewhat forcible; and dissection proves the same thing, especially in the case where the gland is large. The larynx also presents a slightly conical extremity downwards into the thyroid gland;

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* The gland of the pig projects in front only of the trachea, almost within the chest, and is closely covered with muscles. In some primates, as in man, it spreads laterally, but retains a considerable mesian isthmus. In the cat, the dog, the horse, and sheep, after birth (and mostly before), the isthmus fades into a mere film; but the lateral lobes are still subject to muscular compression, either upon an unyielding trachea, or the dilating œsophagus, which, in some instances, is so remarkable, as to constitute, perhaps, the greatest source of pressure.

In some creatures, the sterno-hyoid muscles seem to leave the surface of the trachea uncovered, in order to follow the glands towards the œsophagus: thus it is in the seal and porpoise. In others, again, the gland is inclined to surround the œsophagus posteriorly, so as to press between it and the vertebræ, as in the porcupine. The existence of a thyroid gland in birds has been doubted; yet in a region of goître, the crows, as well as quadrupeds, are said to be subject to the disease. I find the bodies which seem to represent the thyroid in fowls to be placed within the chest, close on either side, against the distensible crop.

and the passage of the food gives the same form to the œsophagus. Parts of the gland are pretty firmly adherent to the upper rings of the trachea; whilst its lateral lobes, or cornua, reach up to the alæ of the scutiform cartilage: but in the usual development of the organ, its most massive portions are placed on either side of the isthmus, extending to the vertebræ, freely gliding upon the surface of the spine and its muscles, and susceptible of slight movements upon the trachea and larynx.

At the instant of the descent of solid food, the trachea may probably yield a little to the pressure in which it is involved: but when all the concurrent means of compression are the most efficient, it is plain that, at the same moment, the thyroid gland is the most extensively applied against the cricoid and scutiform cartilages.

There is a casual circumstance of deviation in the form of the thyroid gland, which may serve to strengthen the view of its alternating states of compression. It frequently happens that a slight flattened pillar of the gland ascends from the isthmus, on either side of the pomum Adami: it is seen, perhaps, rather more often on the left than the right side; and it rarely appears well formed on both*. It is invariably under the influence of the sterno-hyoid muscle: but it is now and then provided with its own muscle; which, descending from the os hyoides, covers the pillar, and is inserted about its base, near the isthmus; thus exerting an extra pressure upon the supplementary portion of gland.

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* The production of the supernumerary portion, or pyramidal appendix to the isthmus, is found in various forms. Sometimes, in the absence of an isthmus, there is a double ascending flattened column; or, the isthmus being more or less complete, the pyramids are also developed: in either case, one or the other pyramid may be absent; one or the other, or both, may be imperfect in fulness or length, and occasionally surmounted by a small isolated spot of the same glandular structure. The occasional presence of a slip of a thyro-hyoid muscle, which is actually inserted into the gland (to raise it), or into the summit of a pyramid, is likewise worthy of note, in connexion with the view of muscular influence. All these deviations I have preserved, and they may be seen in the collection of Guy's Hospital.

PART IV.—USES—TABLE OF HUMORAL CHANGES EFFECTED BY THE VARIOUS ORGANS OF THE BODY—A FLUID PRODUCED FOR ULTERIOR VASCULAR PURPOSES—IS THERE ANY OCCASIONAL RESERVE OF THIS FLUID IN THE CELLS?

The study of the uses of the thyroid gland will perhaps be most advantageously approached by the way of comparison or analogy.

We find a great variety of organs, all of which are destined to produce certain material changes on the fluids distributed to them. In the most simple case, a part derives nourishment from the circulating fluids, and probably produces little or no alteration in them besides what belongs especially to its own support: but there are other cases, where changes of various kinds are effected which are altogether distinct from or superadded to the simple nourishment of the efficient part; and to produce such changes, may be, in any given case, the chief object of the organs concerned.

Whilst the nourishment of a part is indispensable to its existence; the influence which it exerts upon the circulating fluids may be more or less needful for the healthful subsistence of the entire animal.

With reference to the several cases of *humoral change*, the following tabular classification, which refers each particular organ to its appropriate effect or mode of operation, will serve to explain the rank of the thyroid gland, according to the analogy of its action.

All living organs receive supplies of the circulating fluids, calculated to maintain their growth or secerning functions; and, in particular cases, other additional ingredients form essential parts of the materials on which the organs are destined to operate. Now, we find that the circulating fluids, with or without these superadded ingredients, are submitted to the actions of various organs, and to as many different modes of operation, each for its peculiar results.

These materials, these actions, and these results, may, for our present purpose, be arranged as follows:—

ORGANS	RECEIVE	AND YIELD.
The brain, or parts of it, & perhaps other parts	Blood *arterial* .	Blood *venous.*
Bones, muscles, and appendages; coats of vessels; spleen; thyroid and thymus glands, and capsulæ renales . .	Blood *arterial* .	Blood *venous* and lymph (*in lymphatics*).
Cellular and serous membranes	Blood *arterial* .	Blood *venous* and lymph (*in lymphatics*) first deposited for a time.
Kidneys, pancreas, lachrymal and salivary glands, and mucous surfaces	Blood *arterial* .	Blood *venous,* lymph (*in lymphaties*), and excretory fluid.
Skin, and some mucous surfaces	Blood *arterial,* air, &c. . . .	Blood *venous,* lymph (*in lymphaties*), and, in addition, extraneous matters are absorbed. There is also excretory fluid.
Lymphatic and lacteal glands	Blood *arterial* and lymph . .	Blood *venous* and lymph (as a general term).
Liver	Blood *arterial and compound venous*	Blood *venous,* lymph, and an excretory fluid.
Stomach	Blood *arterial* and ingesta .	Blood *venous,* lymph (fluids absorbed by the veins) and excretions.
Villous small intestines.	Blood *arterial* & chyme with secretions . .	Blood *venous,* chyle (in lacteals) and excretions.
Colon	Blood *arterial* and fæces . .	Blood *venous,* colic fluids &c. (in lymphatics; and perhaps veins) and excretions.
Lungs	Blood *venous of all kinds,* chyle, lymph, and pure air	Blood *arterial,* lymph, mephitic air, and water.

This comparative view of the influence of organs upon the fluids is very incomplete; but it may perhaps strike some as the diagram of an important physiological survey *.

For our immediate purpose, it will be a sufficient explanation of the whole, to particularize the circumstances of the thyroid gland; for which alone the arrangement is here introduced.

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* The nervous system, which might form a distinct plan, has been excluded from the present, in order to simplify the view.

The thyroid body is classed among those parts which receive arterial blood, and, in return, afford venous blood and a lymphatic fluid.

Like all parts, it requires to be nourished; but, unlike some parts of the same class, its nourishment does not seem to be the main intention of its vascular supply. Unlike the bones, muscles, &c., it has no very evident mechanical or local office to fulfil. Like the spleen, it continues active through life, or at least the greater part of it;—not so the thymus, &c.: and although its function seems to be periodical, yet we find no evidence of an object to be gained, analogous to a temporary reservoir of blood; or a supplementary means to another function, as the secretion of bile. Yet we may one day be able to shew, that a particular material principle is slowly formed, and partially kept in reserve; and that this principle is also supplementary, when poured into the descending cava, to important subsequent functions in the course of the circulation. It is not unworthy of notice, that whilst the blood of the spleen goes to the liver, its peculiar lymph goes more directly to the right auricle; and, at the same time, that the blood of the thyroid body, as well as its lymph, goes at once to the heart*.

The thyroideal cells have been described as varying in capacity within certain healthy limits, according the existing quantity of the secretion. Now, it is by no means easy to explain the circumstances which affect the fulness of the cells; yet it is difficult to set aside the inference, that something analogous to a reservoir function obtains in this part.

The cells must certainly retain the fluid deposited in them for a greater or less period of time: and when we consider that their capacity is pretty uniform throughout the same organ, but continually varying in different specimens, at least in the proportions of one to two and three or four, we must suppose that the gland is almost always in a state of disease, both in man and animals; or that such a great variation of the secretion is natural and permanent; or that it is natural and transitory*.

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* In contemplating the offices of the spleen, we cannot doubt that it is subject to casual distensions, and that it is capable of an elastic resistance; which properties are manifested, in widely different degrees, in various animals, but not remarkably in man. There is, besides, a glandular or parenchymatous structure—a granular and probably secerning part—which likewise is gradational as to its developement in the animal kingdom. Now, although the reservoir and glandular functions may co-exist in considerable activity, yet in certain animals the first seems to prevail almost exclusively; and in others there seems to be hardly any room, but for the latter function.

The dissection of a very great number and variety of glands has led me to infer that the quantity of the secretion must naturally be variable.

The daily occasional kneadings of the gland, and the consequent excitement of its vascular apparatus, assist greatly to strengthen this inference, and numerous experiments on animals have contributed to establish the same opinions; although the small size of the organ in most of them, the frequent and great differences in the general sanguineous injection, and other circumstances, offer very serious impediments to conclusive experiments†. The most copious turgescence that was ever found, occurred in a large dog, immediately after a full meal off a mass of horseflesh. Doubtless the injection subsides gradually. A favourable opportunity very seldom occurs for examining the human thyroid gland with respect to these uncertain points. The mode of death, the hours that usually elapse previous to the dissection, together with the common differences in the food and habits of individuals, can only serve to increase the obscurity; but it is highly desirable that no convenient occasion of inquiry should be suffered to escape. The whole question might perhaps be determined by a few judicious and careful observations on the state of the injection and secretion, in connexion with the precise times and nature of the last meals, when persons have been recently carried off by sudden death.

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* The last supposition is consistent with innumerable analogies, both in man and animals; as we may perceive in the history of the different parts of the vascular system itself, and in the various vesical appendages of organs.

† In animals, also, the various peculiarities of habit offer topics as interesting as they are difficult of access. Possibly some of the various modes of drinking may influence the thyroideal function. The gland might seem to have but little rest in ruminant animals, and in the herbivora generally to be more subject to the motions of mastication than to those of deglutition. In those animals that hunt with great excitement, perhaps carry their food far, and finally tear and devour it with avidity, the greatest compressions seem to reach the gland in the process of deglutition, and the intervals of repose are protracted. Again, in all probability, the habits of the hog and the insectivora must call for, as well as explain, particular deviations in the physical adaptations of the gland in question: and, lastly, the dilatation of the œsophagus must have a very principal effect when the tube is encircled by the gland, as in the porcupine.

The three subjoined cases will answer the purpose of explaining the necessary kind and mode of investigation; although they are very imperfect specimens of what such observations ought to be. They are abstracted from hasty and more generally pathological histories. Their value can only be shewn by putting them in comparison with similar cases.

Case 1.

Sarah L., aged 5, a poor girl, tall and in good condition, dined at half after twelve, and at four o'clock eat a piece of bread and butter. Soon after this, her clothes took fire, and were almost completely destroyed. The whole anterior part of the body, the neck, face, and shoulders, were deeply burnt. She was immediately carried into the hospital, cold, restless, screaming, and thirsty, and continued much in the same state. She drank a good deal, and vomited frequently.

The fatal collapse was sudden, after ten the same evening.

The body was examined at one the second day following.

The thyroid gland appeared fresh and healthy. It was rather darkly vascular, between the fœtal and adult state as to colour, and of moderate size. It was granular to the eye and even with a good lens. Its cells were not visible; but, when cut into, they afforded a very little thick and sanguineous fluid. The substance was slightly translucent, and, when macerated in water, presented a few cells. A piece in alcohol became firmly fleshy; on being cut, afforded a very smooth surface; and, when gently scraped, gave a little mud, which, when magnified, was seen to consist of minute grains.

Case 2.

Harriet H., aged 25, a fully developed person, swallowed about half a drachm of common arsenic on the afternoon of the 16th of May. In about an hour she became very ill. Emetics were administered, and operated freely: the stomach-pump was also employed. She suffered much pain; was cold, restless, and thirsty; and died very suddenly, at 7 A.M. of the 17th.

The body was examined at one on the 18th.

Besides the local inflammatory effects, there was much general turgescence of all parts. The thyroid gland was of moderate size, rather vascular, and, to the eye, granular. The secretion was not copious, but viscid and pretty clear. In water, many cells became fully apparent.

CASE 3.

George G., aged 48, an excessive drunkard, in good and powerful condition of frame, fell from a chaise, and became immediately comatose, his skull being fissured at the base.

He had been in an habitual state of drunkenness for eight or nine days. Blood was taken from the arm, to the amount of fifteen ounces, with little effect. He died within the third hour from the accident, and was examined at one the following day.

The thyroid gland was large, vascular, and distinctly cellular. Many of its lymphatics were rendered visible by the fluid within them. One, situated superiorly, yielded a little drop; which, put into rectified spirit, became firm, opake, and massive. A second, placed laterally, and near an inch in length, was filled more completely by a little manipulation, and formed a valve-knotted cord, after being bathed in spirit.

The stomach contained a few pieces of nearly-digested meat, with mixed fluids.

In conclusion, the author would urge the importance of examining the organ now under consideration in every post-mortem inspection. Negative observations will lead the way to a nicer discrimination; the knowledge of pathological conditions will have its own uses*; and a careful physiological account, when favourable cases present themselves, may be of the greatest utility.

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* Independently of the more marked disorganizations that have been hitherto made the subject of occasional notice, the thyroid gland presents a no less considerable share and variety of morbid appearances than many of the solid viscera.

Plate 1.

Fig. 1.

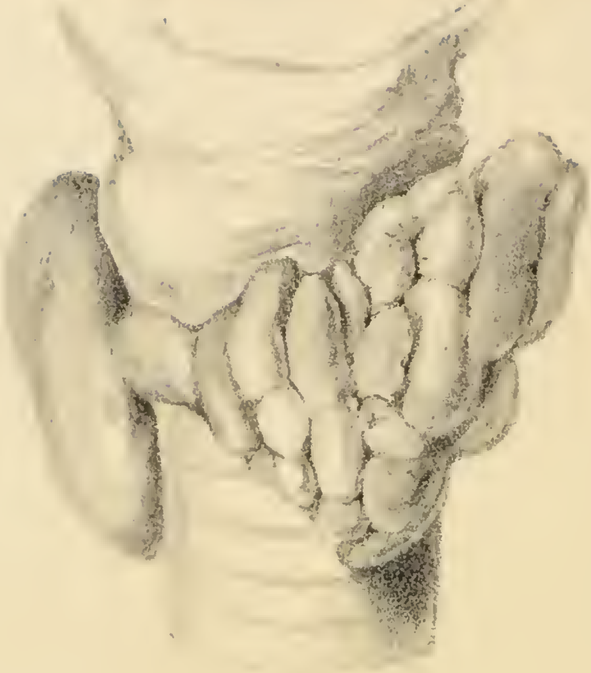
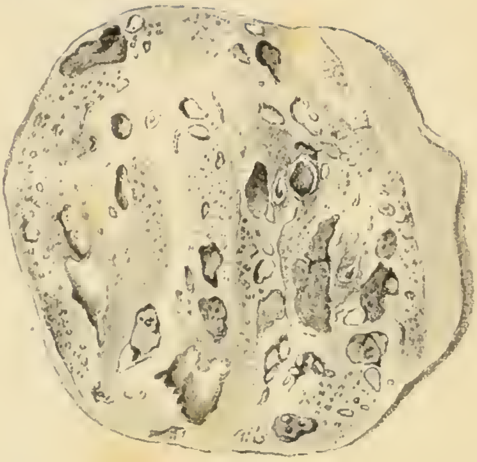


Fig. 3.



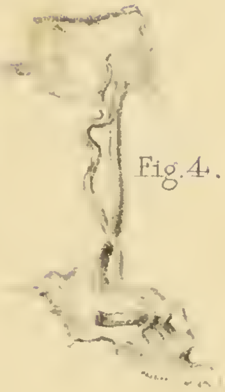
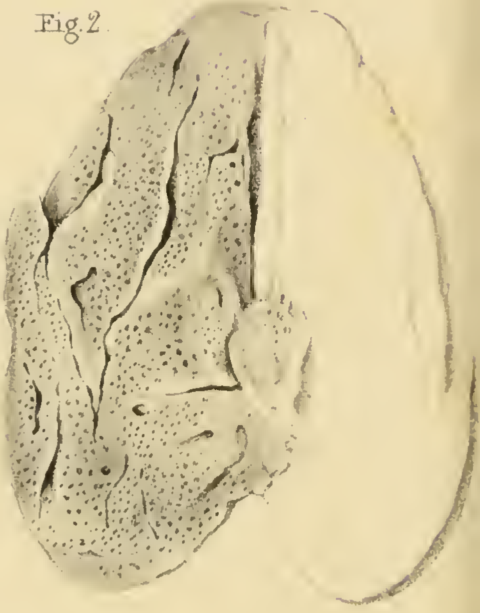


Fig. 4.

Fig. 2.



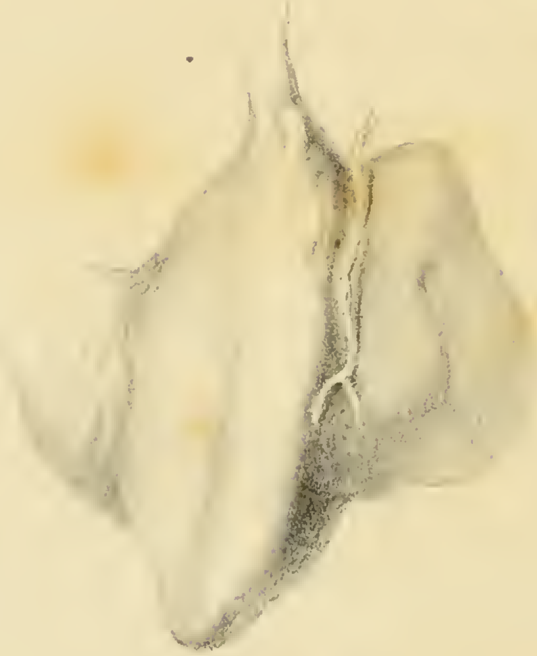


Fig. 5.

Drawn on Zinc by C. J. Canton.

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PLATE I.

The drawings of this Plate are from the dissections of Mr. King, which are placed in the Museum of Guy's Hospital. They may serve to explain the structural arrangement of the thyroid gland; but it is scarcely possible to pourtray clearly the appearances of minute and delicate parts, which are perfectly distinct in the original specimens.

Fig. 1 is from the thyroid gland, one half only of which has been deprived of its investing membrane; so that the surface is seen made up of scaly portions or lobules. The form and packing together of these, with the interlobular sulci, are well shewn. This appearance results from the most complete dissection of the surface, after the gland has been indurated in spirit. In the original, these lobules are evidently composed of minute cells, in great numbers, and in close aggregation.

Fig. 2 represents a vertical section through the thickest part of a cornu or lateral lobe of the gland. One face only of the section is delineated carefully. The interlobular fissures, and the cellular structure of the lobules, are seen. The specimen here represented contains the coagulated secretion of the cells perfectly distinct, in the form of innumerable little grains, such as may be procured at any time by scraping a fresh section of the gland hardened by spirit or boiling water.

Fig. 3 gives an appearance which may be more easily understood. It is taken from the section of an hypertrophied gland, previously indurated. The cells are seen everywhere more or less dilated, and filled with a secretion similar to that which is found in health, when coagulated.

Fig. 4 shews something of the appearance of a lymphatic tube, and some of its divisions after the secretion had been coagulated within them. In this state, the efferent vessels may easily be separated by dissection. Adjoining vessels are left for the sake of comparison.

Fig. 5. This figure represents an absorbent, like the preceding The knotted form derived from the valves is quite distinct.

NOTES ON THE STRUCTURE OF THE THYROID GLAND, BY SIR ASTLEY COOPER, BART.

On hearing lately that Mr. King was about to publish an account of his examination of the thyroid gland, I was desirous of knowing in what respects his observations coincided with those which I made upon the same organ some years ago: and the result of communicating with him on the subject has been a determination to give in conjunction the particulars of our researches.

The facts which Mr. King and myself have noticed in common receive confirmation from the independent testimony thus afforded of their truth; as my observations, though antecedent to his, were totally unknown to him, and had been reserved for publication at a future time.

The extent to which I had proceeded in the investigation will be best shewn by the accompanying letters, and by a simple transcript from my note-books for the years 1824 to 1830.

Extract from a Letter from Mr. Edward Cock.

"*St. Thomas's Street, July* 29, 1836.

"My dear uncle—To the best of my knowledge, you "mentioned to me the existence of the cells of the thyroid "gland, and the fluid which it contains, in the year 1825. . . " . . . . . . Believe me yours affectionately,

"Edward Cock."

Extract from a Letter from Mr. Thomas Cock.

"*John Street, Pentonville, July* 29, 1836.

"I perfectly recollect your talking to me about a fluid that "you had procured from, or observed in, the thyroid gland: "and I think that we together submitted the fluid to the "action of some re-agents.

"As to dates and places, I think it was in Dover Street, "Piccadilly: and if that were the case, it was at the end of "1827, or early in 1828.

"I well remember your telling me that you procured the "fluid by cutting the gland into slices, and setting them to "drain. I think you procured the glands of sheep.

"T. C."

A Letter from Dr. Babington.

“ 31 *George Street, Hanover Square, July* 31, 1836.

“ My dear sir—I enclose you a copy of the only memo-“ randa I can find on the subject of the fluid which you sent “ me for examination. A second letter, which I am impressed “ with a belief that I wrote you, would, if you could lay your “ hand on it, I dare say, be found to contain a more detailed “ account of my proceedings on the occasion.

“ There is no date either to your letter or my answer, as “ contained in my note-book; but, from collateral circum-“ stances, I know that they must both have been written in “ the end of January 1827. You have the memoranda ver-“ batim, as they were noted down at the time for my private “ use. Such as they are, they are quite at your service.

“ Believe me, my dear Sir, very truly yours,

“ *To Sir* Astley Cooper.” “ B. G. Babington.

“ The following letter was sent me by Sir Astley Cooper; “ accompanied by specimens of a thick liquid, contained in “ three very small phials. Two of the specimens were of a “ dirty yellowish colour: the third dark, and apparently tinged “ with blood. They were all very offensive in smell, as if “ animal fluids passing into a state of putrefaction. A portion, “ in a watch-glass, had been evaporated, and resembled small “ pieces of glue.

(copy.) “ *Dover Street.*

“ ‘ My dear sir—You will really very greatly oblige me ‘ by making an accurate examination of this fluid. It is pro-‘ cured, under very peculiar circumstances, from a part of ‘ the animal body, which I will at a future time impart to ‘ you. It is neither exactly albumen nor fibrine. It coagu-‘ lates by alcohol; and is rendered very elastic by sulphuric, ‘ nitric, and muriatic acids, by tannin, and the muriate of ‘ iron. It dries, as you will see, into a kind of glue, and re-‘ dissolves. If you dip a glass tube in it, and put it in spirits ‘ of wine, a membranous cylinder will be formed. Any fatty ‘ matter attached to it is extraneous, as well as any colouring ‘ matter. I will thank you to be secret about it; and to ‘ believe me always yours.

(Signed) ‘ Astley Cooper.’

‘ I will see you soon.’

" To this I sent the following Reply:—

" ' My dear sir—I have examined with attention the fluid ' contained in one of the small bottles, and I find it to consist ' almost entirely of albumen. It is much more concentrated, ' that is, less diluted with water, than common serum or white ' of egg, and does not seem to contain any free alkali. I ' cannot agree with you in the fact, that, when dried by heat ' into a horny substance, such as you have sent in the ' watch-glasses, and such as may also be obtained from se- ' rum, it will re-dissolve. It does, indeed, become somewhat ' softened, and renders turbid the water which is digested ' on it; but I cannot effect any thing like a perfect resolu- ' tion, or a nearer approach to it than with other dried albu- ' men. As to the presence of fibrine, it is essential, to my ' notion of that principle, that it should be a solid. When ' liquid, it does not differ in chemical character from albu- ' men; nor is it proved to differ from it in any way. The ' substance into which this fluid is converted by the action ' of alcohol seems to owe its elasticity, beyond that of the ' white of egg treated in the same way, to the concentrated ' state of the albumen, together with the absence of soda; both ' which circumstances would necessarily much increase its ' tenacity, on coagulation. One of our latest chemical writ- ' ers, Dr. Turner, tells us, that strong alcohol digested on ' fibrine converts it into adipocere; of course, dissolving ' such portion as it acts on. Certainly, no such conversion ' takes place here. I have not had time to verify the expe- ' riment with fibrine.

' Thirty-one grains of the fluid which you have sent con- ' sist of 9 grs. dry albumen; $\frac{1}{10}$ of a gr., gelatine; $\frac{7}{10}$, ani- ' mal extractive and salts; the rest, water. Serum of blood ' usually contains between 8 and 9 parts in 100 of albumen; ' while here we have about 29 parts in 100: thus corrobo- ' rating my opinion regarding the cause of the tenacity. ' There was not a sufficient quantity of the fluid to enable ' me to ascertain its specific gravity.—Trusting that the re- ' port I make may prove satisfactory,

' I remain, my dear Sir, very truly yours,

(Signed) ' B. G. Babington.'

" Sir Astley, in reply, thanked me in a very handsome manner for the trouble I had taken; and stated, that the albumen of the white of egg seemed very different from this fluid.

" In prosecution of my examination of a further portion of the fluid furnished me by Sir Astley Cooper, I have found that it is coagulable by heat into a mass more firm than that of white of egg; that, mixed with water in equal portions, it completely coagulates—though not into a solid, yet so as to enable us, by filtration, to separate the coagulated from the fluid portion. The fluid portion thus obtained gives a copious precipitate with tincture of galls, and also with subacetate of lead; thereby indicating the presence of gelatine and mucus.

" To revert to the fluid itself, liquor potassæ of the London Pharmacopœia, added in small quantity, coagulates it into a substance which is transparent and stiff, like strong calf's-foot jelly. The same effect is produced on white of egg both by liquor potassæ, as noticed by Thompson, the only author who alludes to the circumstance, and by solution of caustic soda. It is hence rendered very inprobable that free soda should be the cause which keeps albumen in the fluid state, as supposed by Brande. That Sir Astley's fluid is essentially albuminous, is additionally proved, by its possessing this property in common with white of egg; and, as far as I know, in common with no other fluid in nature. Ammonia does not produce this effect on albumen.

" All the chemical books assert that æther coagulates albumen; but this is not the case if the æther be pure. It does not unite with white of egg, or with Sir Astley's fluid; nor does it affect them in any way. If agitated strongly with white of egg, it becomes intimately suspended in this viscid fluid, and is not disengaged again for some hours: still, there is no chemical union. While thus engaged in the albumen, if this latter be heated in a test tube, an ebullition ensues, which continues till the æther has carried away with it all the albumen, or, in other words, till the whole has boiled away; and this without any further application of heat than that which sets up the action.

" The last sample of Sir Astley's fluid was slightly acid;

" which I attribute to a change in the gelatine it contained.
" Oxymuriate of mercury, tincture of galls, and nitrate of sil-
" ver, coagulated it.

" Having detected the presence of gelatine and mucus in
" this fluid, which, however, principally consisted of albumen,
" I endeavoured artificially to imitate its composition, by
" adding liquid glue and gum-arabic to uncoagulated white of
" egg. By the addition of about one-fourth part of the for-
" mer, or less than that proportion of melted jelly or isinglass,
" I found that I could form a compound, which, when dropped
" into alcohol, was much more tenacious than white of egg
" alone; and approached, in this quality, though it did not
" equal, the fluid sent to me by Sir Astley Cooper."

NOTES ON THE STRUCTURE OF THE THYROID GLAND IN MAN AND ANIMALS, BY SIR ASTLEY COOPER, BART., MADE IN 1826 & 1827.

A.—Of the human thyroid gland.

1. On making an incision through the thyroid gland, towards the trachea, its structure affords a flaky (or laminated) appearance.

2. When its vessels are filled with fine injection, the gland appears minutely vascular and cellular.

3. On one occasion I found a muscle passing from the os hyoides to the thyroid gland on the left side.

4. (April 5th, 1827.) The thyroid gland contains a fluid. In the human thyroid this fluid is transparent and thin: it is coagulated by sulphuric acid, by the nitric, and muriatic acids, and by alcohol.

5. Examination of the fluid of the human thyroid gland by Mr. Thomas Cock*:—

" Sensible qualities:

" Fluid very viscid, but unlike white of egg (possessing some consistence, like gum-water, without ropiness). It conveys a lubricating sensation when rubbed between the fingers; but soon dries, and becomes adhesive. It is transparent, with a slight tinge of brown. Heat coagulates it, without rendering it opake, as in the case of white of egg. The coagulum is not re-dissolved in boiling water. The fluid is also coagulated by alcohol and by sulphuric acid. It is miscible with water; and the mixture becomes opake by the application of heat or alcohol."

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* A gentleman whose accuracy and extensive chemical knowledge induced me to put confidence in his observations.

6. In a subsequent examination, the fluid of the human thyroid gland, when expressed, was found to resemble treacle in consistence: heat and alcohol coagulated it strongly: sulphuric acid made it a very solid body: nitric and muriatic acids also coagulated it: acetic acid coagulated it more slightly. Liquor potassæ coagulated it, rendering it ropy and elastic.

Water, in which the gland had been macerated, gave a copious precipitate with sulphuric acid and alcohol. The residue, after evaporating the water, was crystalline. Liquor ammoniæ, poured upon it, caused but little effect. The blow-pipe produced charcoal, with a horny smell as it burned.

7. I examined the fluid from the thyroid gland of a child. It was much more liquid than that from the gland of the sheep or horse. It was coagulated by alcohol, the nitric, sulphuric, and muriatic acids, by tincture of galls, and muriated tincture of iron. There was no proper muscle to the gland in this case, as related in Note A. 3.

8. The fluid from the gland of another child also coagulated in a similar manner.

B.—Note on the thyroid gland of the cat.

1. In the cat, I find the thyroid gland also contains a fluid, which is coagulated by the muriate of iron.

2. (1824.) In the cat, the structure of the thyroid gland is cellular.

In the rat, and the mole, a similar structure may be observed.

C.—Note on the thyroid gland of the dog.

1. After the removal of the two thyroid glands of a large living dog, they were found to contain a fluid, which was transparent, and coagulable by sulphuric acid*.

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* *On the thyroid gland of the dog.* (1836.)

One gland is found on each side of the trachea. On the surface are numerous and large absorbents. When these are injected, besides absorbents, taking the course of the superior thyroideal artery, there is one to be observed on each side, descending to the junction of the jugular and subclavian veins behind

EXPERIMENT OF REMOVING THE THYROID GLANDS.

In January 1824, I removed the thyroid glands of two puppies ten weeks old, by one wound in the side of the trachea of each. I lacerated the arteries, to prevent hæmorrhage and avoid the necessity of ligatures. On the first day, no effect was produced until the evening, when both were ill, and one vomited. On the second day they were better, and both were found sucking. Neither of them was quite well; but one was more ill than the other. On the third and fourth days they were less lively than another puppy of the same litter not submitted to operation. On the fifth, sixth, and seventh, one of them was ill: the other much recovered: the symptoms only those of common irritation. On the eighth day they were doing well. On the thirteenth, both were recovering, but one more slowly than the other. When the wounds were perfectly healed, and the animals quite recovered, I killed them; and found that the glands had been cleanly removed, but that an absorbent gland on each side of the neck under the jaw was enlarged.

D.—*Notes on the thyroid glands of the sheep.*

1. In the sheep there are two thyroid glands, generally united by a small intermediate portion. They are composed of cells, which are full of fluid. Mercury thrown into the arteries passes upon the cells, but does not easily enter them, for they are very minute. The veins admit of a more copious injection; and appear to communicate freely on the surface of the cells, where they form a net-work. The cells do not communicate with each other. (See Plate II. *Fig.* 1. & 2.)

2. (March 14, 1826.)—I injected the thyroid gland of a sheep, by the arteries, with quicksilver. The artery, after entering the gland, divided into very small branches, which opened into little cells.

When examined under a microscope, the gland appeared, divided by a net-work, into cells; but each of these latter consisted of a great number of smaller cells.

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behind the sternum. In 1824, when I put a ligature on the jugular vein and cellular membrane around it, a large absorbent vessel for the thyroid gland appeared.

The fluid removed from the gland of a sheep appeared, under the microscope, to contain a number of minute globules. It crystallized, like other animal fluids. It dried into a solid cake, like glue; which was, to a considerable amount, soluble in hot water. It coagulated with alcohol and sulphuric acid.

3. In the ox, the fluid possesses characters similar to those of the secretion in the sheep.

E.—Notes on the thyroid glands of the horse.

1. The horse has a thyroid gland on each side of the trachea, and each one receives two very large arteries. The structure is distinctly cellular. It is easy to fill the arteries and veins with injection, and to corrode them. When mercury was extravasated on the surface of one of these glands, it was immediately received into the absorbent vessels, and two lymphatic glands became filled*.

2. The fluid from the gland of a horse coagulates with heat, alcohol, and muriatic acid; with muriate of iron very firmly. During the process of inspissation the fluid feels like glue.

F.—On the thyroid gland of the pig.

1. In the pig, the thyroid gland is placed on the fore part of the trachea, just above the sternum. It is large; and composed, internally, of numerous cells, which appear to have no communication with each other. The cells are distended with a fluid, which the gland secretes abundantly, and which may be procured by cutting into various parts of the organ.

2. Mercury was extravasated into the thyroid gland of a sow, four hours after the death of the animal. A few cells became filled; but the lymphatics soon conveyed the injection to an absorbent gland on the front of the trachea.

3. The fluid from the gland of the same animal was transparent and yellow, slightly saline, and resembled melted jelly.

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* Five years ago I completely succeeded in injecting the thyroideal absorbents of the horse with coloured gelatine. Several vessels, escaping from the interior of the gland, passed on to some adjoining lymphatic glands; and finally formed a vessel, by the side of the trachea, as large as a small quill, proceeding from the gland to the veins. This preparation I have now sent to the Museum of Guy's Hospital. The vessels are distinctly represented in Plate II. *Fig.* 3.

When alcohol was poured upon it, an immediate and very firm coagulation ensued; by which an extended membrane was formed, fibrous and extremely elastic. The same effect was produced by the sulphuric, nitric, and muriatic acids. Acetic acid coagulated the secretion, but less firmly. Liquor potassæ coagulated it: it was miscible in warm water: it was partially coagulated in hot water, assuming a flaky appearance. Exposed to the air, it dried into a solid; and this, immersed in warm water, dissolved in part, and precipitated a salt. A similar solid was formed on glass, over a flame.

As the structure, products, and use of the thyroid gland are still capable of forming the subjects of interesting inquiry, it is my intention to pursue the investigation, in conjunction with Mr. King, who has shewn great talent for accurate and minute observation.

PLATE II.

Fig. 1. Shews the cellular structure of the thyroid gland of the the sheep, the cells of their natural size.

Fig. 2. A portion of the same, magnified.

Fig. 3. A portion of the larynx and trachea of a horse:
Thyroid gland.
Absorbent glands, receiving the vessels of the thyroid.
Large absorbent trunk, seen of the natural size, formed from the vessels of the thyroid gland, and passing down the neck upon the side of the trachea, to terminate in the veins.

Plate II.

Fig. 3.

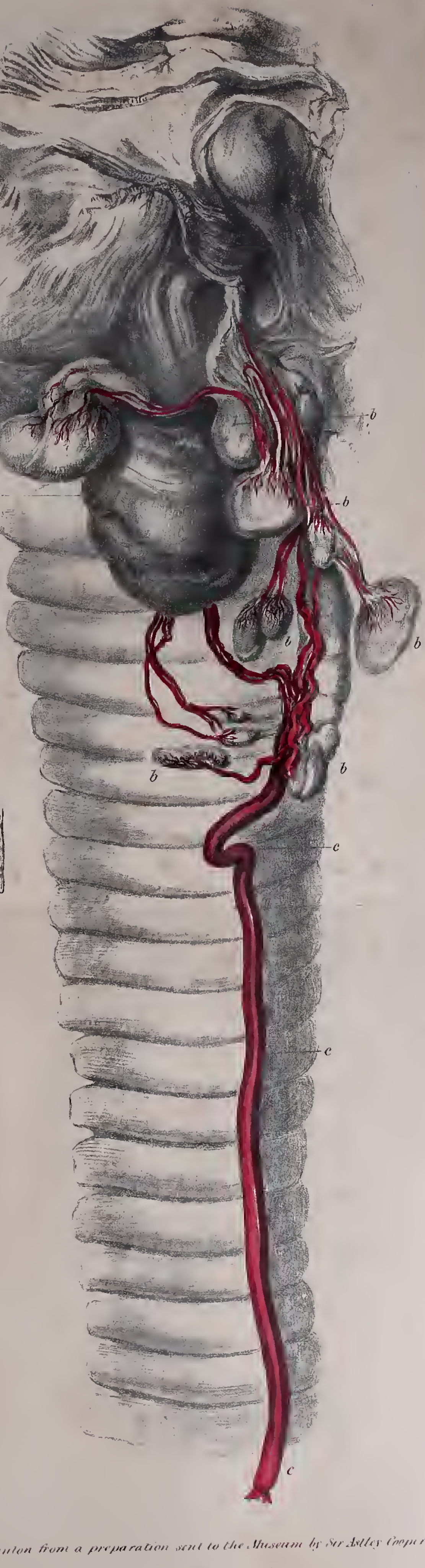


Fig. 1.

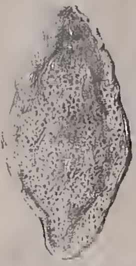
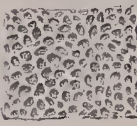


Fig. 2



Drawn by C. J. Canton from a preparation sent to the Museum by Sir Astley Cooper Bar

Published by S. Highley Fleet St.

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APPENDIX

TO

NOTES ON THE THYROID GLAND,

BY SIR ASTLEY COOPER, BART.

(*See Page* 21.)

THE following extract from a lecture on the Thyroid Gland, delivered by Sir Astley Cooper at St. Thomas's Hospital, is from the manuscript copy of the lectures taken in the years 1798, 1799, by Mr. Earl, surgeon at Cromer.

"THE thyroid gland is placed near the thyroid cartilage, " from which it takes its name. Although it is called a " gland, it cannot be proved to be one. It is formed of two " lobes, one on each side the cricoid cartilage, extending as " high up as the thyroid cartilage. On the fore part of the " cartilage is a substance similar to it, which unites one lobe " to the other. At its inferior part, it rests on the trachea: " on cutting it, it appears of a cellular structure, having " large cells extending on every part of its substance. I " have seen a substance resembling coagulable lymph, only " more gluey, flow from it when cut. This gland is very " vascular, having four arteries going to it: they are called " the guttural arteries: two superior, coming from the " carotid artery; and two inferior, from the subclavian. Its " nerves are very small, but the absorbents are very large " and very numerous. I have found absorbents, as large as " a crow-quill, going to the thoracic duct. As this gland " has no duct, it is probable the absorbents perform that " office, and that they convey the fluid into the thoracic " duct."

An account follows in the manuscript, of experiments of removing the thyroid glands of a dog and of an ass, which were attended with curious results; but these will be given in detail, when the physiology of the gland is brought under consideration, in a future number of the Reports.